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ABSTRACT

This booklet presents basic nutrition background information and class activities for teachers of kindergarten through sixth grade. It is divided into five units. In the first unit, the six nutrient groups (carbohydrates, fats, protein, vitamins, minerals, and water) are listed with descriptions of their functions and sources. A discussion is included of the special dietary needs of the school aged child. Unit 2 discusses the different food groups, daily food needs, and balancing food selections in menus. School meals, snacks, breakfast needs, and food behavior patterns are also addressed. Growing and processing food are the topics of the third unit. In Unit 4, consumer information is presented, including: nutrition labeling, unit pricing, cents-off coupons, and other factors influencing decisions on food buying. Unit 5 offers information on nutrition and health, obesity, dental disease, and iron deficiency anemia. A list of organizations, agencies, and publications that offer information on nutrition is appended. (JD)

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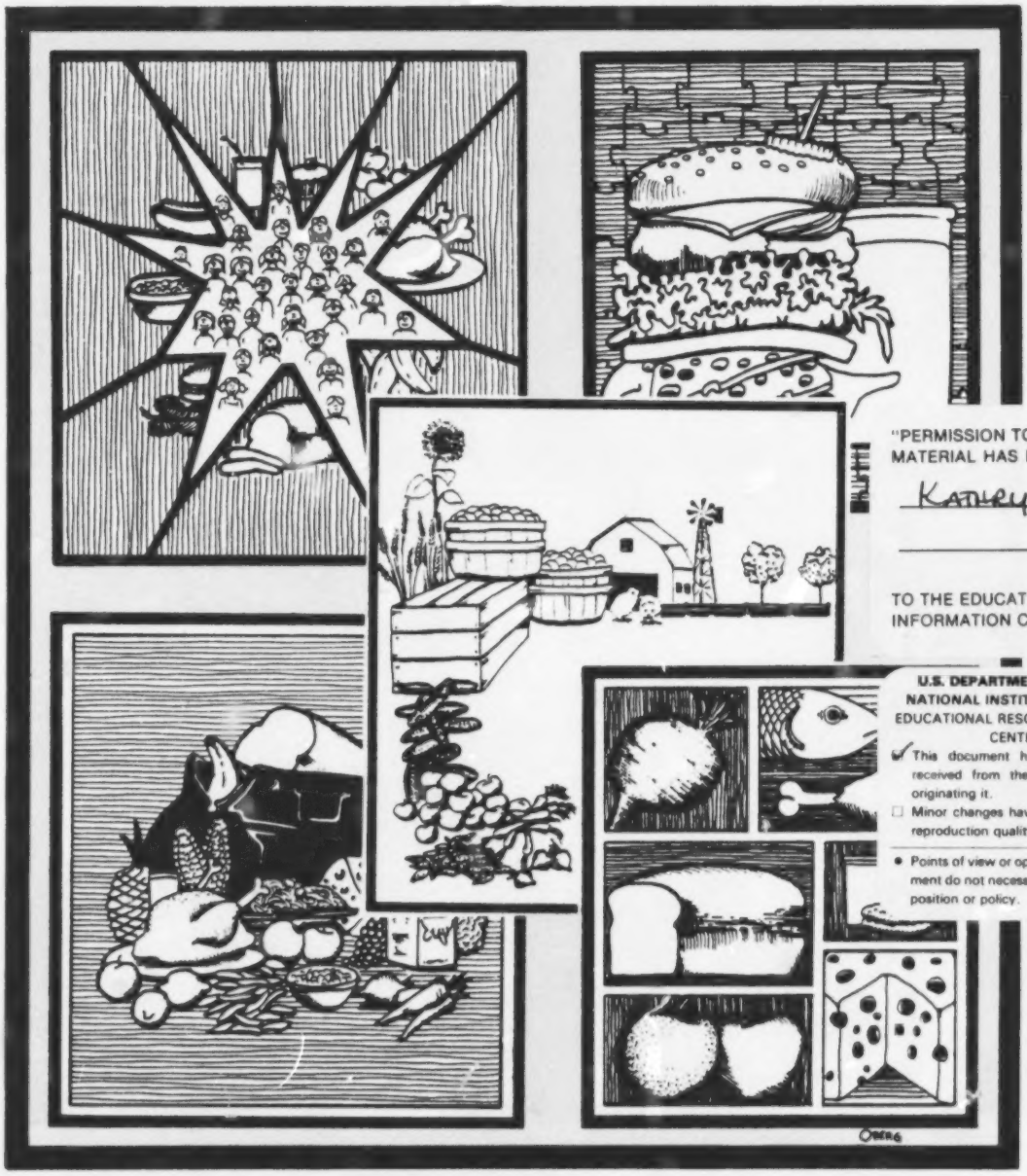
Nutrition in Bite Size Pieces

Nutrition Education in the K-6 Classroom



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PREFACE

In the past children predominantly learned food selection skills and good eating habits at home within the family unit. Times are changing: children are coming to school now with few of these skills mastered. Teachers are finding that children do not know how food products are made, where foods come from or how to make wise food selections. They're discovering that children choose many high calorie-low nutrient foods. The nutritious foods are ending up in the trash barrel. The physical and mental health of individuals is linked to the types of foods that are eaten. Several major diseases are related directly to particular food consumption patterns: heart disease, obesity and dental disease are a few.

We believe that learning to choose a healthful and varied selection of foods is an important lesson for children to learn and carry with them into adulthood. Teachers who include nutrition in their curriculum can have a positive impact on children's eating habits; consequently, affecting their potential to grow and develop to be healthy adults. We believe that learning to eat right to stay healthy is a skill as important as reading and writing. Nutrition can be an exciting study of food and how it works in our body. Lessons in nutrition are easily adaptable for classroom use and help children develop food selection skills and healthful eating habits.

This booklet gives you some basic nutrition background information as well as several ready-to-use nutrition activities for your classroom. We hope this material will help you include a nutrition component in your curriculum.

In addition to the materials provided here and other suggested references at the end of the booklet you will find many local sources of help when you seek nutrition education information. Your School District Food Service Director, Local Dietitians, Local and National Dairy Council, Local and State Cooperative Extension Service, have both materials and expertise in nutrition education. Some of your most helpful and enthusiastic resources are to be found among your students' parents.

We wish you luck and success in this exciting education offering.

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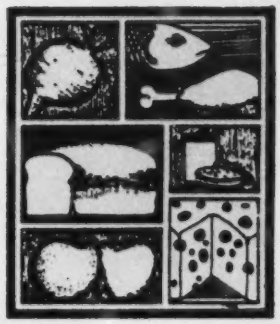
WHAT'S SO SPECIAL ABOUT FOOD?



Food is special in many ways. There are some special **FUN** properties of food. Foods have unique odors; each food smells different, while combinations of foods have yet different smells. Foods have distinctive and varied tastes, and tastes change from the addition of just a little spice. Foods have appealing colors and color combinations.

To children food has added excitement. Foods are interesting to touch, feel and chew. It is fun to learn how foods are prepared and how new foods taste. Foods have different textures, shapes, and consistencies as well.

ACTIVITY 1.1: GUESSING BOX

Objective

Students will become aware of the shape and texture of foods.

Materials

A small box or ½ gallon milk carton with a hole cut in one end large enough for a student's hand. A cut-off sock could be fitted over the hole. Food items small enough to fit in box; for example, a piece of fresh fruit, or vegetable or a small grain such as rice.

Communication Skills K-3

In the Classroom

Place a food item in the box. Have the student put her/his hand in the box, feel the food and guess what it is. After correctly identifying the food, have student describe color, texture and flavor of food.

Making foods, either by combining different types or cooking them together, is a fun experiment. Investigating foods is a fascinating science with an endless choice of samples.

In addition to the special **FUN** properties of food, there are special **PRACTICAL** properties of food. The **PRACTICAL** properties of foods are nutrients which along with oxygen help sustain life. Nutrients combined in proper amounts, maintain healthy bodies, allow for continuous repair and growth, and supply energy for any movement of the body; working, playing, or just breathing.

Foods can be divided into six nutrient groups: carbohydrates, fats, protein, vitamins, minerals and water. No foods has all the nutrients necessary for adequate health and few foods contain only one nutrient.

CARBOHYDRATES, FATS and **PROTEINS** are energy nutrients. **CARBOHYDRATES** are found mostly in foods of plant origins. Carbohydrates are sugars and starches. Examples are sugars in fruit, starches in grains and vegetables and sugar in milk.

FATS are the most concentrated form of energy. One gram of carbohydrate or protein in the diet produces 4 kilocalories of heat or energy, whereas one gram of fat will produce 9 kilocalories of heat or energy. In addition to being a source of energy, fat is important in improving the flavor and palatability of food, as a carrier of fat soluble vitamins (A,D,E,K), and as a source of essential fatty acids. Some food sources of fat are corn oil (100% fat), mayonnaise, butter, peanut butter, cheese, eggs, tuna fish, meats, and milk (whole milk, 3½% fat and skim milk, ½% fat).

PROTEINS are the third classification of energy nutrients and are essential for growth in children and maintenance and repair in people of all ages. Amino acids are the building blocks of protein. Hormones, digestive enzymes, hemoglobin and antibodies are important compounds made from protein. Protein in the diet often comes from meat such as chicken, pork and beef; however, there are other very good sources such as fish, peanut butter, cheese, beans, legumes, eggs, and milk. The value of the protein depends upon the balance of amino acids. Eggs are an example of a complete high quality protein since they contain a balance of amino acids. If a protein source, such as eggs, is eaten, the body gets a sufficient amount of all essential amino acids and can use the protein efficiently. The protein values of some other foods, such as rice or beans, are not as high; these are called incomplete proteins. They are important in the diet and can be used wisely as good protein sources by combining two or more of them together. Rice and beans, when combined together, supply a complete protein for the body by each supplying an amino acid the other lacks. There are many such combinations common in our diet such as corn and beans, nuts and grains, and peanut butter and bread.

ACTIVITY 1.2: FOOD SORTING ACTIVITY

Objective

Student will learn how to classify food according to the food's composition.

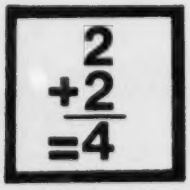
Materials

Chart showing percentage carbohydrate, fat and protein of selected foods, interlocking wheels diagram, pencils. See page 5.

In the Classroom

Given a selection of foods, students will assign each food a number based on which section of the circle diagram they think the food should be located. Check answers with sheet at the end of Unit 1.

Teacher: Review with students common sources of proteins, fats, carbohydrates prior to activity.



Math 4-6

VITAMINS, MINERALS and **WATER** are regulator nutrients. **VITAMINS** are found in most foods. There are several vitamins especially important to growing children. **VITAMIN A** is a fat soluble vitamin important in vision adaptation from light to dark. It is also important in formation and maintenance of healthy skin and cell membranes of the intestines and nasal passages. Good sources of vitamin A are dark yellow fruits and vegetables and dark green vegetables like spinach, carrots, broccoli, orange squash, apricots, watermelon and peaches. **VITAMIN C** is a water soluble vitamin, important for the wound healing process, resistance to infection, and efficient utilization of iron and calcium in the body. Good sources of vitamin C are broccoli, brussels sprouts, cabbage, oranges, lemons, spinach, strawberries, lima beans and potatoes. **VITAMIN D** is a fat soluble vitamin important for teeth and bone formation. Milk is usually fortified with vitamin D and is the major dietary source. The skin is able to produce vitamin D when exposed to ultraviolet rays of sunlight. See pages 6, 7, and 8 for other important vitamins and minerals.

Of the mineral group, **CALCIUM** is of special importance for growing children. It is necessary for proper bone and teeth formation, the blood-clotting mechanism, nerve impulse transmission, and muscle contractions. Calcium is found primarily in milk and dairy products, as well as dark green leafy vegetables, dried peas and dried beans. **IRON** is also important for growing children. Iron combines with a protein to make hemoglobin, which carries oxygen in the blood. Liver is the richest source of iron, but iron is also found in red meat, fish, eggs, fortified bread and cereal products, beans, peas and nuts.

WATER is necessary in all metabolic processes in the body. It transports nutrients in the blood, is used to synthesize body tissues, acts as a lubricant, and helps regulate body temperature. The adult human body is made up of 60% water: A person weighing 70 kilograms (154 lbs) will contain 40 liters (over 10 gallons) of water. Our major source of water in the diet is from beverages but water is found in most foods as well: lettuce is 96% water and milk is 87% water.

ACTIVITY 1.3: HIGH CALORIE vs. LOW CALORIE FOODS

Objective

Students will understand a property of some high calorie foods. Most high calorie foods are high in fat while many low calorie foods have high water content.

Materials

Onion skin paper, pieces of food including a slice of hot dog, a cube of white cheese, potato chip, slice of carrot, slice of apple and a slice of potato, and a marker to label food stains.

In the Classroom

Have students press each of the foods onto the onion skin, in the appropriately labeled area. After the stains have dried, the student will observe the transparent, greasy stains left by some of the foods. These are the foods that contain fat, the higher calorie energy nutrient.

Science K-6

SPECIAL NEEDS OF THE SCHOOL AGE CHILD

There is a gradual increasing need for all nutrients and energy during the growing years of the school age child. Lengthening of the long bones, an increasing musculature and increasing blood volume continues through adolescence. Growth comes in spurts; children need to accumulate scores of nutrients needed during these growth spurts especially for the adolescent growth spurt, which they enter next. All of the nutrients, previously mentioned in this unit, are necessary in sufficient quantities to promote growth. For example, **PROTEIN** is needed for building tissues, like muscles and organs; **VITAMIN D, CALCIUM** and **PHOSPHORUS** for the formation of growing bones; and **IRON** for the increased number of red blood cells needed to 'feed' the new tissues. Children expend much energy running, jumping, and playing; therefore, they need enough food to supply energy to meet these demanding activities.

ACTIVITY 1.4: FOOD FOR MY BODY

Objective

Students will identify specific nutrients found in food and the function of those nutrients in relation to their body.

Materials

Large roll of paper, markers for outlining, drawing, and labeling, glue, old magazines, scissors.

In the Classroom

The students will lie down on a large piece of paper and have someone trace an outline of their body. Students will draw in some bones, a few blood vessels, the brain, eyes, hair, finger and toenails, organs such as liver, kidney, heart, somach, etc. Student will cut out pictures of a food or foods from magazines. Glue the foods on the body outline according to their functions. For example: Protein foods can be put on organs, muscles, hair and nails; foods containing iron can be put next to blood; vitamin A foods can be put on the eyes; milk products containing calcium can be put near the bones and teeth. Specific nutrients found in the pictured foods which are necessary for the formation of the body parts can also be labeled. See functions of nutrients at the end of this unit.

Science K-5

SO WHAT'S SO SPECIAL ABOUT FOOD?

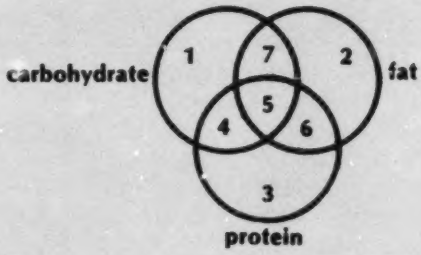
Food is particularly important for children. They are growing fast and the foods they eat must meet their body's needs. Children might be more willing to learn good food habits if they know how foods help them grow.

We need food to stay alive, grow, and be healthy. It is fun and interesting to study about the foods we eat.

ACTIVITY 1.2: FOOD SORTING

Do these foods contain carbohydrate, fat, or protein?

____Peanut butter	____Crackers, Saltine	____Milk, skim
____Milk, Whole	____Oatmeal	____Cookie, Chocolate Chip
____Ground Beef	____Potato	____Orange
____Margarine	____Beans, Dry	____Ice Cream
____Bread	____Cheese, Cheddar	____Tuna Fish
____Carrots	____Salad Dressing, Mayonnaise Type	____Egg
____Hot Dog, All Meat	____Corn	____Pie, Apple
____Pot Roast	____Sugar	____Macaroni
		____Banana



Composition information* and answers to Activity 1.2

Food	Protein	Fat	Carbo-hydrate	Correct Answer
Peanut Butter	27	53	20	5
Milk, Whole	30	30	40	5
Ground Beef	55	45	–	6
Margarine	–	100	–	2
Bread	13	6	81	4
Carrots	9	–	91	1
Hot Dog, All Meat	30	65	4	6
Pot Roast	81	19	–	6
Banana	4	–	96	1
Crackers, Saltine	10	10	80	5
Oatmeal	15	8	77	4
Potato	10	–	90	4
Beans, Dry	26	2	72	4
Cheese, Cheddar	42	53	3	6
Salad Dressing, Mayonnaise Type	–	75	25	7
Corn	11	4	85	4
Sugar	–	–	100	1
Milk, Skim	43	–	57	4
Cookie, Chocolate Chip	10	30	60	5
Orange	6	–	94	1
Ice Cream	13	29	58	5
Tuna Fish	77	23	–	6
Egg	50	50	–	6
Pie, Apple	4	22	74	7
Macaroni	13	2	85	4

**The number of grams of protein, fat and carbohydrate was determined for each food. Based on the total weight of energy nutrients which was assigned a value of 100%, relative percent of carbohydrate, fat and protein were determined. Answers based on composition of at least 10% of nutrient.*

Food Sorting Activity adapted from slide set "Energy: Our Food and Our Needs" prepared by Cooperative Extension Service, Cornell University, Ithaca, NY.

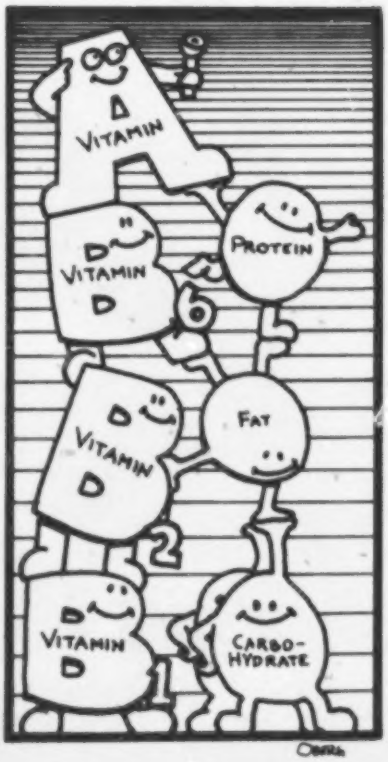
NUTRIENT FUNCTION CHART

Nutrient	Function	Food Sources
CARBOHYDRATE	Supplies energy, helps body use fat and other nutrients	grain products, sugar foods, honey, cakes, fruits and vegetables
FAT	Supplies concentrated energy; supplies essential fatty acids which are needed for healthy skin, and fat soluble vitamins (A,D,E,K); helps body use other nutrients	cooking fats, oils, butter, margarine, salad dessings, whole milk, cream, cheese, ice cream, nuts
PROTEIN	builds and maintains body tissues; needed for enzymes, hormones, antibodies and body proteins; regulates body functions	plant sources: dried beans and peas, cereals, nuts, breads animal sources: meat, poultry, fish, seafoods, eggs, milk and milk products
VITAMINS		
vitamin A	helps eyes adjust to dim light; needed for normal vision; maintains healthy cell membrane; promotes growth and development	liver, dark green and deep yellow vegetables (broccoli and carrots)
vitamin B_1 (thiamin)	helps certain enzymes change food into energy; maintains healthy nervous system; necessary for normal growth; fertility and lactation	lean pork, organ meats, dried beans and peas, whole grain and enriched breads and cereals, some nuts and seeds
vitamin B_2 (riboflavin)	helps cells use oxygen to change food into energy; helps maintain good vision and smooth skin; helps prevent scaling and cracking of skin around mouth and nose	milk, cheese, eggs, leafy greens, meats, especially organ meats, enriched and whole grain bread
vitamin B_6 (pyridoxine)	helps enzymes in metabolism of protein; necessary for proper growth and maintenance of body functions	meat, fish, poultry, shellfish, liver, dark green leafy vegetables, whole grain cereals, dry beans, bananas, eggs, nuts

vitamin B_{12} (cobalamin)	needed for normal red cell development, and proper functioning of all cells, especially bone marrow, nervous system and intestines; helps prevent certain types of anemia; helps synthesis of certain amino acids	foods of animal origin only, milk and milk products, cheese, fish, eggs, meats, poultry
vitamin C	strengthens blood vessel walls; promotes growth and tissue repair; needed in bone and teeth formation, gum formation	citrus fruits and juices, strawberries, cantaloupe, broccoli, potatoes, green leafy vegetables
vitamin D	helps body use calcium to build bones and teeth	vitamin D fortified milk, fish, liver oils, shellfish, egg yolk, sunlight
vitamin E (tocopherols)	an antioxident, which helps prevent oxygen from destroying other substances; needed for red blood cell formation and for cell wall maintenance	vegetable oils, whole grain cereals, green leafy vegetables, seeds, nuts, liver
folic acid (folacin)	needed for red blood cell formation; necessary to convert food to energy	liver, dry beans and peas, dark green leafy and yellow vegetables, nuts, fresh oranges, whole wheat products
niacin (nicotinic acid)	promotes normal appetite and digestion; helps certain enzymes change food into energy; helps maintain healthy skin, tongue, digestive tract and nervous system	lean meats, organ meats, eggs, poultry, fish, leafy greens, peanuts, dried beans and peas, whole grain and enriched breads and cereals
MINERALS		
calcium	helps build bones and teeth; involved in blood clotting mechanism; helps nerves, muscles, and heart to function properly	milk and milk products, dark green leafy vegetables, dried peas and beans

Nutrient Function Chart (continued)

Nutrient	Function	Food Sources
iron	needed to form hemoglobin, which carries oxygen in the blood; helps cells use oxygen	organ meats, egg yolk, dried beans and peas, dark green leafy vegetables, dried fruit, molasses, whole grains and enriched grains
phosphorus	helps build strong bones and teeth; helps regulate muscle-nerve action; helps certain enzymes change foods into energy; necessary for food metabolism	liver, milk, fish, meat, cheese, ice cream, eggs, dry beans, whole grain cereals
iodine	needed for proper functioning of thyroid gland, prevents some forms of goiter	seafoods, iodized salt, some processed foods
magnesium	helps body use food for energy; promotes healthy bones and teeth; promotes conduction of nerve impulses; necessary for food metabolism, protein synthesis, and detoxification of alcohol in the liver	nuts, whole grain products, dry beans and peas, dark green leafy vegetables, cocoa, molasses, clams, cornmeal
zinc	helps heal wounds; necessary for vitamin A use; constituent of many enzymes needed for digestion and food metabolism; needed for insulin use and bone metabolism. Deficiency associated with retarded growth and delayed sex maturation. Necessary to maintain pregnancy and for normal fetal development.	seafoods, meats, fats, oils, nuts, nonfat dry milk, cheese, eggs, whole wheat cereals, oats, legumes, lima and green beans



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PUTTING FOOD TOGETHER

We need nutrients to grow and stay healthy, but we don't eat "a bowl of nutrients." We eat various foods from which our bodies take nutrients. Selecting the appropriate foods to form a complete, balanced diet can be compared to choosing the correct placement of pieces in a puzzle. Eating an adequate, complete diet requires making informed food choices on a daily and weekly basis. In this manner we fit all the nutrient pieces into a complete diet puzzle.

The USDA offers a way to plan a day's food choices by using the **DAILY FOOD GUIDE.** Foods are divided into five groups. The foods within a particular group supply similar nutrients.

- **THE FRUIT AND VEGETABLE GROUP** includes all fruits and vegetables and their juices. These foods supply vitamins, especially vitamins A & C, minerals and fiber.

- **THE BREAD AND CEREAL GROUP** includes all grain products, like cereals, rice, pasta, oats, barley, cornmeal and flour. These foods supply vitamins, especially the B vitamins, and minerals. Grain products are usually enriched with several vitamins and minerals. The bread and cereal foods are good sources of calories needed for growing children.

- **THE MILK AND CHEESE GROUP** includes milk and milk products, like ice cream and yogurt, and all cheeses. This group supplies calcium, vitamin A, protein, and vitamin D (when milk fortified with vitamin D is used).

- **THE MEAT-FISH-POULTRY AND BEAN GROUP** includes nuts, seeds, dried beans and peas, eggs, poultry, fish and red meats. These foods supply protein, iron, several vitamins, and other minerals.

- **THE FIFTH GROUP** includes foods that are high in calories and low in nutrients; for example, butter, margarine, mayonnaise, salad dressings, candies, soft drinks, alcohol and some baked goods.

Communication Skills
K-3

ACTIVITY 2.1: DAILY FOOD GUIDE

Objective

Students will be able to select foods from each food group in the Daily Food Guide and place them in the appropriate group.

Materials

A large sheet of paper for each child, old magazines, pencils, glue or paste and scissors.

In the Classroom

Student will divide a large piece of paper into 5 sections as illustrated. Each student will cut out foods from magazines for each food group and paste these pictures on the paper in the appropriate area. For combination foods, discuss how each basic component fits into one of the groups.

F&V	B&C	M&C	M,F,D,&B	F,S,&A

BALANCING FOOD SELECTIONS

Using the **DAILY FOOD GUIDE** is one way to balance food selections. The size of servings will vary with age and activity level. The calorie content will also vary with selections within the food groups.

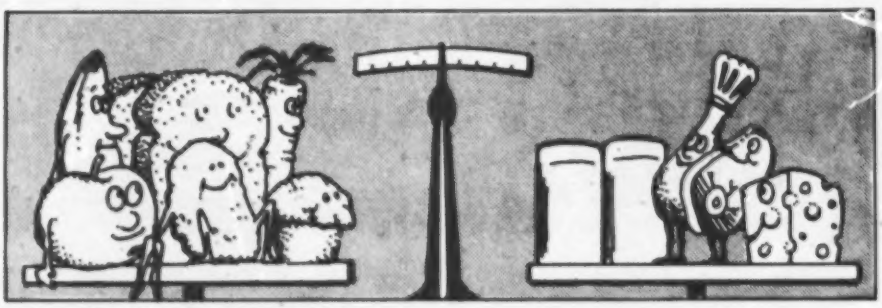
It is suggested that growing children eat mainly from the first four groups by selecting:

4 servings from the **FRUIT AND VEGETABLE GROUP**

4 servings from the **BREAD AND CEREAL GROUP**

3 servings from the **MILK AND CHEESE GROUP**

2 servings from the **MEAT-FISH-POULTRY-BEAN GROUP**



ACTIVITY 2.2.: BALANCING THE MEAL MOBILE

Objective

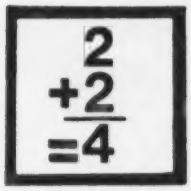
The students will plan food selections for one day.

Materials

Wire, small branches, or coat hanger, string, 3" square pieces of paper.

In the Classroom

The students will plan a day's meals and snacks in the 4-4-3-2 fashion. They will draw each food on the paper, and cut out and color foods. They will attach food choices to their own mobiles. Students will balance their mobile as they balanced their day's choices. Students may plan for only one meal with choices from each of the Food Groups above instead of the entire day.



Math 3-6

The Daily Food Guide is only one aid in planning an adequate diet.

In February 1980 a booklet "Nutrition and Your health" was published jointly by the U.S. Department of Agriculture and the U.S. Department of Health, Education and Welfare to aid consumers in making food choices. The booklet outlined seven dietary guidelines:

1. Eat a variety of foods
2. Maintain ideal weight
3. Avoid too much fat: saturated fat and cholesterol
4. Eat food with adequate starch and fiber
5. Avoid too much sugar
6. If you drink alcohol, do so in moderation
7. Avoid too much salt

Individual nutritional needs vary based on age, sex, lifestyle, body size, and physical activity, but the dietary guidelines can be used to plan food choices for most healthy Americans.

THE FIRST MEAL OF THE DAY

BREAKFAST is particularly important for growing children. After 10-12 hours of not eating, children need a good meal with enough calories and nutrients to get them "fired up" in the morning for a full day of learning and exercise. It has been shown that children remain alert, maintain higher morale, perform better and achieve higher grades when they have eaten breakfast.

As more parents work outside the home, less attention may be given to breakfast preparation. Children are often left to fix their own breakfast. There are many foods or food combinations that taste good in the morning that children can prepare themselves. For example, peanut butter on toast, yogurt and bananas, chicken and biscuits, muffins with butter, cheese sandwich or a waldorf salad supply important nutrients and are acceptable breakfast choices. It's important for parents to make sure the foods are available for children to prepare and consume.

SCHOOL MEALS

SCHOOL LUNCHES provide important amounts of nutrients for children and may offer the most balanced and well-planned meal some children receive. Some schools also offer breakfast. The lunch menus are planned to meet guidelines under the National School Lunch Program administered by the U.S. Department of Agriculture. The amounts of food planned in the menus are based on the needs of children 9 years and over; they may be increased or decreased to satisfy the needs of younger and older children. The menus provide:

8 ounces of milk (including whole, skim, lowfat, chocolate or buttermilk)

2 ounces of meat or substitute. Substitutes include 2 eggs, 2 oz. cheese, 1 c. dried peas or beans, and 4 Tbsp. peanut butter

¾ c. of vegetables/fruit. At least two items are included in this category

1 slice enriched bread or substitute, such as ½ cup whole grain cereal, rice, pasta, or grits.

SCHOOL BREAKFAST is also available to any school which applies, through the U.S. Department of Agriculture. The breakfast menu includes:

8 ounces of milk

½ cup fruit, vegetable or full strength juice

1 slice bread or ¼ cup cereal grain product

SNACKS — COMPLETING THE PUZZLE

Can snacks fit into this 'puzzle' of foods? The answer depends on how much is eaten at meals and what is chosen for snacks. There is nothing wrong with eating the foods or nutrients your body needs at times other than the traditional 3 meals a day.

If trying to consume all the foods needed by a growing child results in huge meals that turn children off, snacks can be beneficial. However, eating snacks, which represent extra food and calories beyond that needed by the body, may lead to obesity. Chosen wisely, snacks can provide the 'missing pieces' in our diet. They don't have to be regarded as foods that are primarily sugar and/or fat; nor do they have to be limited to carrot and celery sticks. Such things as fruit, juices, yogurt, pudding, raw vegetables, crackers, popcorn and deviled eggs are also good snacks. The list is endless, and should draw from all the food groups mentioned earlier. The important thing to remember when planning meals and snacks is the total day's calorie and nutrient needs.

Children, especially, like to eat smaller quantities of food at more frequent intervals. Often children are so engrossed in other activities that they want to eat only enough to satisfy their initial hunger pains. These urges to snack can be taken advantage of by planning and providing appropriate foods and discouraging the consumption of foods and liquids that contain sticky carbohydrates which linger along the teeth and gumline, leading to dental disease.

ACTIVITY 2.3: FOOD PREPARATION

Objective

The students will sharpen communication skills using preparation of a food as subject of discussion.

Materials

2 pieces of bread, or crackers, jar of peanut butter, jar of jelly, knife, plate, napkins.

In the Classroom

Students will give detailed directions to a partner about how to make a peanut butter and jelly sandwich. Partner will follow each instruction VERBATIM in order to give students feedback on the preciseness of their directions. Discuss nutrients in the sandwich and food groups represented. (Same activity can be performed making a vegetable or fruit salad.)

Communication Skills
Art 4-6

FOOD FROM OTHER PLACES

Food preferences change from person to person just as they change among groups of people. Food preferences which vary from culture to culture may be influenced by climate, religion, tradition, and individual family customs.

RELIGION may be an important factor influencing food choices. For example, most Seventh-day Adventists are lacto-ovo-vegetarians: consumption of eggs, milk, and milk products is acceptable, but meat is not eaten. Judaic law forbids certain meats and fish from being eaten. Meat and dairy products cannot be served at the same meal. People of the Hindu religion also have food choice restrictions. Many Hindus do not eat eggs or meat, particularly beef.

MEAL PATTERNS and **FOOD BEHAVIOR PATTERNS** around the world also differ. In the United States we traditionally eat three meals a day. In other countries numbers of meals may be different. The English consider afternoon tea an important meal time in addition to breakfast, lunch and dinner. Amounts eaten at a given meal vary from place to place. For example, in Latin America the noon-day meal is the largest meal whereas in this country dinner is usually the largest meal of the day.

CULTURAL food customs are interesting and intriguing to children. For example, the Chinese and Japanese eat their foods with chop sticks rather than knives, forks and spoons. In Hong Kong, meat from dog is a popular delicacy, though in the U.S. the idea of eating dog or cat meat is unappealing.

People who are **VEGETARIANS** do not eat meat or meat products. This food pattern may be influenced by religious beliefs, culture, or personal philosophy. Lacto-vegetarians will eat/drink milk and milk products and ovo-lacto vegetarians will eat eggs in addition to milk and milk products. People can obtain all of the necessary nutrients for growth and health without eating meat, though strict vegetarians (no milk or eggs) may find it difficult to get enough vitamin B_{12}, because it is found mainly in animal products.

FOOD PREFERENCES of people in the U.S. represent a typical food behavior which differs in some ways from people in other countries. However, even in the U.S. food preferences may vary from region to region, from one ethnic group to another, or among age groups. For example, Mexican Americans enjoy tacos (from the meat, poultry, fish and bean group); people in the south have traditionally eaten fried okra (from the vegetable group) and grits (bread and cereal group). The important thing to remember is that people in other places who may eat foods unfamiliar to us can combine the foods they like into a balanced diet with all the necessary nutrients.

ACTIVITY 2.4:

CULTURAL FOOD PATTERNS

Objective

The students will learn how foods traditionally eaten in other countries can fit into the daily food guide.

Materials

Pictures of food, pencil and paper

In the Classroom

The students will choose a country (ex. China or Mexico) and collect either pictures or actual examples of foods from each of the food groups. Discuss the names of the foods with the children and together determine to which of the four food groups each example belongs. After the pictures or examples have been arranged by food group, allow each child to combine their choices of the Chinese or Mexican foods to make a balanced meal, representing each of the food groups.

Social Science 2-6

EXAMPLES OF CHINESE FOODS:

Fruits & Vegetables	Bread & Cereals	Milk & Cheese	Meat/Poultry/ Fish/Beans
bean sprouts	rice	fermented	pork
snow pea pods	noodles	milk	chicken
bamboo shoots	grain sprouts	products	eggs
water chestnuts			soybeans
mushrooms			seafood
onions			
apples			
oranges			

EXAMPLES OF MEXICAN FOODS:

Fruits & Vegetables	Bread & Cereals	Milk & Cheese	Meat/Poultry/ Fish/Beans
tomatoes	corn tortilla	goat milk	goat meat
papaya	rice	cheese	beef
pineapple	tamales		pork
oranges	corn pudding		beans
guavas			chicken
carrots			
beets			
red peppers (chiles)			
avocados			

Selecting a **WIDE VARIETY** of foods is important in acquiring all the necessary nutrients for good health. Foods from each of the food groups should be chosen throughout the day. Children need at least three good meals a day; breakfast is particularly important in starting off the school day. Nutritious snacks are an important way for growing children to get an adequate nutrient intake.

3
FARM TO TABLE

There are up to 15,000 different items in a large grocery store—and about 13,500 of them are food items! Where do all these diverse products come from? It is sometimes difficult to imagine how complex the process of getting food products from the farm to the grocery store and eventually to our tables, actually is. Today, one farm worker in the United States produces farm products to feed 65 people. For every farm worker there are four to five non-farm workers supplying resources used in producing, processing, transporting, wholesaling and retailing farm products.

Animals and plants require the same basic elements to grow and develop as humans do; we all need nutrients and water. Children are fascinated by the growing process; for example, planting a dry bean seed, watering it and watching it develop into a tall plant which yields green beans they can actually eat! The United States provides food of high quality and quantity and it all starts on the farm.

GROWING FOOD ON THE FARM

The American farmer produces much more food than our country can use. Vast land resources and varieties of soils, climates, and terrains in the U.S. makes this possible. Every type of food (feed for livestock, grain, vegetable, fruit, nuts and livestock) can be successfully grown somewhere in this country. Many vegetables grow in California and Texas; apples and cherries come from Michigan and Washington; citrus fruit is grown in Florida, Texas and California; pineapples flourish in Hawaii; peanuts grow in several southern states; potatoes grow in Idaho and Maine; poultry farms are centered in the South; beef cattle, hogs, and sheep graze in the west and southwest; finally, dairy products come from the northeast and the Great Lakes region.

Many U.S. farmers and ranchers raise their products on a large scale, that is, on thousands of acres. However, the average size farm is 440 acres. Complex technologies have been developed for raising any food item—plant or animal. Soil preparation, insect/pest control, and harvesting techniques are among the farmer's major concerns. **SOIL PREPARATION** involves tilling the soil to change its structure and fertilizing it to add nutrients and essential trace elements which maximize plant growth. The type of soil is also very important. For example, blueberries grown in Michigan need a particularly high acid soil to grow properly, while alfalfa (animal feed) only thrives in a high alkaline soil.

Once a crop is planted, the farmer protects his crop by preventing damage by harmful insects, plant disease, rodents, and weeds, all of which could reduce crop size. There are thousands of insects which are harmful to different plants and many can destroy a crop in a relatively short time. For example, a swarm of locusts can strip a wheat field in a

matter of minutes, and the tomato horn worm can do considerable damage to tomato plants. **INSECTS** are controlled by insecticides designed to destroy the unwanted insects while leaving the food crop unharmed. Mechanical techniques are also used. For example, reflective aluminum strips placed in vegetable fields can reduce or prevent insect attacks on cucumbers, squash and watermelon.

WEEDS are a threat to the farmer's crop because they compete with the crop for nutrients in the soil and light. The farmer often uses herbicides to control weed growth or he can introduce insects which will feed on weeds but leave the crop unharmed.

HARVESTING is the final farm process with which the farmer is fully involved. Harvesting has traditionally been done by field laborers, but it is becoming increasingly mechanized. For example, corn picker machines can snap the ears of corn at the stalk and digger pickers can harvest potatoes. A combine harvests wheat by cutting the standing wheat, threshing the grain from the straw and chaff, cleaning the grain and bagging or bundling it. With this modern technology it takes about five minutes to completely harvest a bushel of wheat. Although vegetable crops, such as asparagus, celery, lettuce, and cabbage are still harvested by hand, advances are being made toward mechanical harvesting.

ACTIVITY 3.1: GROWING BEANS

Objective

The students will learn that plants need special nutrients in the soil plus light and water to grow.

Materials

Package of bean seeds; fertilizer, 3 pots, one filled with sandbox sand, another with garden soil, and the third with some garden soil to which fertilizer will be added.

In the Classroom

The students will plant seeds, label, and place each of the pots in the same light (a fluorescent light may be used). Students will water all three pots when necessary. Keep records of number of seeds planted, the amount of fertilizer added and weekly growth in height of each plant. Bean plants will produce beans in about 55 days. Record the amount of beans produced by each plant and compare results.

Science K-6

PROCESSING OF FRUITS, VEGETABLES AND GRAINS

FOOD PROCESSING is a broad term referring to many procedures used in commercial preparation of foods for consumption. Examples are: storing, freezing, canning, dehydrating, cooking, milling, washing, and chopping.

The final food processing of any crop determines the variety and kinds of crops the farmer initially plants. Vegetables such as beans, cabbage, lettuce, carrots, spinach and tomatoes produce large yields per acre and are likely choices for destination to a fresh produce market. In this case the farmer is interested in high quality appearance and good taste. If, however, a crop is destined for canning, freezing, dehydration or pickling, the farmer looks for fruit and vegetable varieties which are most adapted to a specific processing. Often he plants several varieties of a fruit or vegetable so he will have an even crop production over a period of time and processing can continue uninterrupted.

There are numerous processing features which are important to a specific food crop or item. Pre-marketing operations such as **WASHING, PRE-COOLING** and **WAXING** of fresh produce are common practices. **PRE-COOLING** is a process which begins right after harvest to help slow down the natural deterioration of fruits and vegetables which begins right after picking. Vegetables such as cucumbers, peppers, and tomatoes are **WAXED** to protect them from drying out and to improve appearance.

STORAGE TECHNOLOGY especially refrigeration, is essential in preserving nutrient quality and extending the life of fruits, vegetables, grains, meats, and dairy products. Fresh fruits and vegetables are stored temporarily up to 4-6 weeks in order to extend the period during which consumers can buy them. Cold storage is especially important in meat processing to retard microbial growth and other undesirable enzymatic and chemical reactions which lead to spoilage or decomposition and decay.

Individual **PACKAGING** for consumer convenience is a highly organized, elaborate process. Fresh produce, such as lettuce, is often packaged at the same location it is harvested.

MILLING is a food processing procedure which prepares grain crops for use in foods. Wheat is the largest grain crop produced in this country but others such as barley (mostly used for animal feed and beer production), rye, oats, maize and sorghum and rice are grown. In the milling of wheat the edible endosperm is separated from the bran outer layer. After milling, about 72% of the original grain remains to become flour. After milling, flour is packaged either for retail markets or it is sold wholesale to industries which specialize in making bread, cakes, biscuits and many other flour-based baked goods. One of the chief recipients of grain flours is the breakfast cereal companies. These companies use different grades of flour to manufacture many forms of boxed cereals. Recently the manufacture of baked snacks and crackers used for hor d'eouvres has become a growing division in the cereal company's markets.

ENRICHMENT is a process which often follows milling. During milling, some nutrients (usually vitamins and minerals) are destroyed or depleted. The enrichment process replaces nutrients which were lost in processing. Many grain products are enriched with thiamin, riboflavin, niacin and iron.

FORTIFICATION of foods is a procedure in which nutrients which were not originally present are added. Many cereals are fortified with extra vitamins and minerals. Milk is fortified with vitamin D because this vitamin must be present along with calcium (found in milk) for proper absorption of calcium in the body.

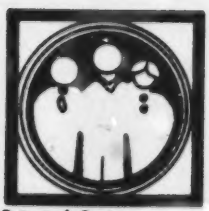
ACTIVITY 3.2: WHERE DO FOODS COME FROM

Objective

Students will understand the processes foods undergo from the farm to the dining table.

Materials

Paper and pencils



Social Science 3-6

In the Classroom

List several food items familiar to the students, such as bread, ice cream, bacon or bologna, applesauce, instant mashed potatoes and orange juice. Each student will choose a food and describe processes the food underwent from farm to table.

Example: bread
farm: grown from seed and harvested by combine
storage: in grain elevators if necessary
milling: to remove outer layer and refine the flour
enrichment: vitamins and minerals added
transport: bagged for wholesale distribution to bakeries
industry: mixed with yeast, water, eggs, etc. to make bread
packaged: by bakery
distributed and sold: to retail grocer
priced and placed on shelf: usually by distributor
bought by consumer

PROCESSING OF MEATS AND DAIRY PRODUCTS

MEAT PROCESSING requires an entirely different technology than fresh fruits and vegetables or grains. Slaughter houses purchase livestock and poultry from breeders and convert the meat (usually beef, pork, veal, poultry or lamb) into food and non-food products (bone, gristle). These edible products are distributed and sold to meat packaging facilities which continue the processing. This may include making sausage or curing meats such as ham, bacon, brisket of beef (corned beef) and luncheon meats.

PACKAGING of meat is usually a highly automated process. Cellophane and other materials may be used to ensure safety, sealability, and visibility to the consumer. Supermarkets often buy fresh meat in bulk and do their own packaging.

The **DAIRY** farmer has an entirely different set of concerns which are reflected in dairy processing procedures. Under good conditions a milk cow can produce about 25 qts. of milk per day. Milking is done by machine usually twice a day. The cows are first cleaned, then the udders are fitted with a pulsating vacuum which draws the raw milk into milk cans and then into the farm milk tank. Milk is very perishable and must be cooled to 50°F(10°C) within two hours and maintained at that temperature until delivered to the consumer. Milk will remain fresh for about two weeks if handled properly. Tankers or trucks empty the farm milk tanks and deliver it to milk plants which process it into a variety of dairy products including pasteurized milk, cream, cultured buttermilk, skim milk and yogurt. Still other factories specialize in making concentrated and dry milks, butter, cheese, and ice cream. About 90% of all market milk is **PASTEURIZED.** All raw milk contains bacteria which are generally harmless or even beneficial, but there may be a chance of harmful bacteria which could cause serious illness. Pasteurization is a heating process which destroys dangerous (as well as harmless) microorganisms. The milk is heated to 160°F (71°C) for 15 seconds. This is sufficient time to destroy harmful bacteria. Most whole milk is **HOMOGENIZED** after it is pasteurized. This is a process which evenly distributes the fat into very small globules throughout the milk. As a result no cream separates out to the top and the milk has a richer flavor and fuller body.

Science K-6

ACTIVITY 3.3: PRESERVATION BY REFRIGERATION

Objective

The students will learn the importance of cold storage (refrigeration) in preserving the quality and extending the life of foods.

Materials

Two containers of milk

In the Classroom

The student will put one container in the refrigerator and leave one at room temperature. Compare the two milks after 24 hours and 48 hours. Point out that the unrefrigerated milk has soured and spoiled because microorganisms which thrive at room temperature have been allowed to grow.

Every step involved in the farm-to-table process is concerned with **PRESERVATION** of foods. Preservation prevents or retards spoilage of foods. Principle preserving processes include refrigeration, freezing, drying (dehydration), fermentation and pickling, and the use of additives. Common additives used to extend shelf life of foods are salt, vinegar, calcium and sodium propionate (in baked goods), sugar, and benzoate of soda (used to prevent discoloration of dried fruits).

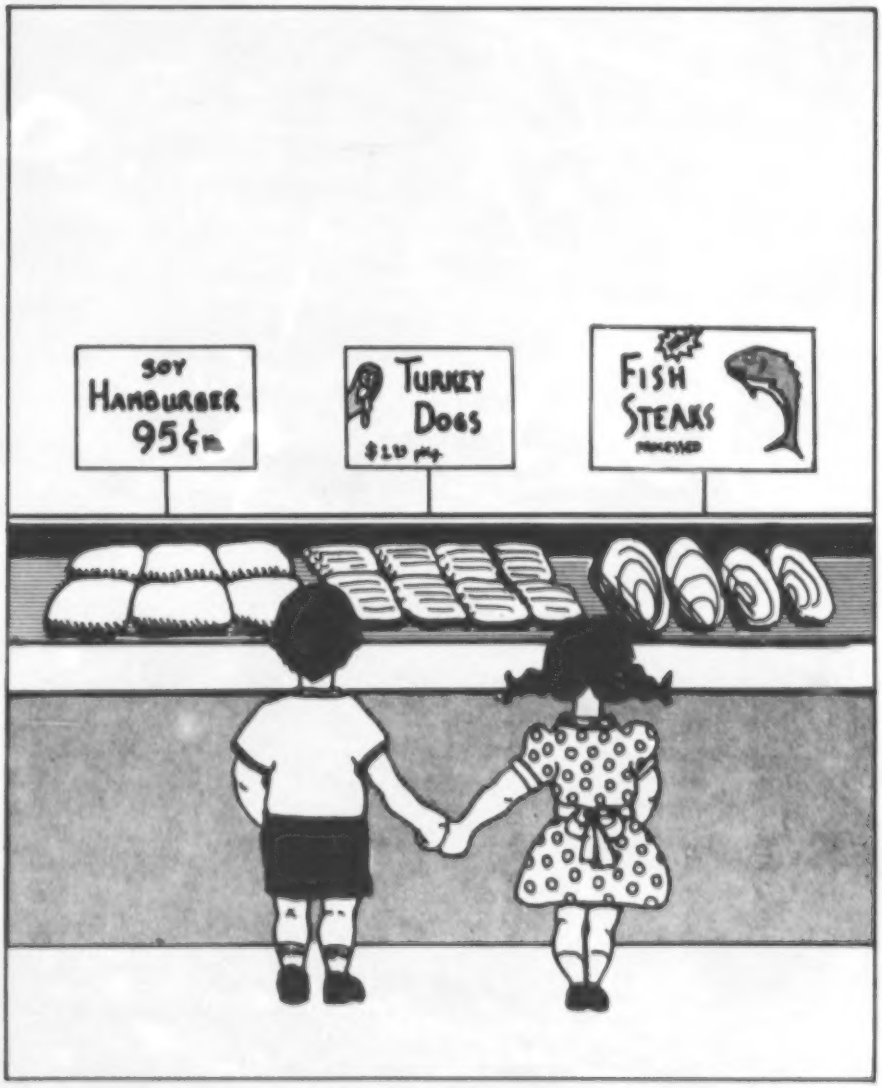
The issue of **ADDITIVES** in our food supply often becomes controversial. The FDA (The Food and Drug Administration) controls the use of additives in our food. Extensive research is required of any chemical to be added to a food. The Delaney Clause of the Food Additive Amendment states that any additive, in any amount, that causes cancer in any animal cannot be added to food. The FDA is very careful to monitor the use of additives to ensure the safety of our food supply.

QUALITY CONTROL is an important feature of food technology. Since the food industry is so large and serves millions of people, there must be some standards of safety to assure consumers that they are receiving quality foodstuffs. The United States Department of Agriculture (USDA) and the Food and Drug Administration (FDA) regulate the safety and quality of our food supply. For example, a division within the USDA carries out a mandatory inspection program for meat and poultry sold between states. Similar inspection programs are required for meat sold within a state. The FDA protects the consumer from unsafe additives and impure foods. It is important for children to realize that the safety of the food they eat is carefully guarded by these governmental agencies.

NEW FOOD PRODUCT DEVELOPMENT has multiplied the variety of foods which are available to the consumer. Advanced food technology has made it possible for industry to make changes in food composition (potato flakes are processed from raw potatoes), to fabricate entirely new forms (synthetic milks and coffee whiteners), and to make substitutes (margarine as a substitute for butter). Special-purpose foods are important in expanding varieties of foods we buy: low-sodium foods for persons

with heart or circulatory problems, low-sugar foods for diabetics and low-calorie foods for weight watchers. Unique new foods have been developed from protein concentrates that are texturally similar to meat and fish. Bacon substitutes and soy "hamburger" are examples in this category. The interest and competition in developing and marketing new food forms is keen and such innovation in the food industry has increased the consumer's ability to choose variety as well as to satisfy special health and diet needs.

There are multiple processes involved in farming, manufacturing, and delivering food from its original, natural state to our dining table. Sophisticated technology and innovative development of new food products has made the American food industry the largest in the world. By learning and discovering where our food comes from and how it is handled to reach our table, children gain a greater appreciation for the food they eat.



4

CONSUMER'S POWER

Learning to make decisions is very important for children. They are eager to decide many things for themselves. Making any decision requires information and skill. Just as children are taught at home and at school to make correct choices in language formation and math solutions, they need food and nutrition information in order to make correct choices in food selection. Children make decisions every day about the food they eat, so it is important to help them become informed consumers. With the overwhelming choices of food items, young consumers need to learn skills of selectivity, discrimination and objectivity to make intelligent food choices. Children also need a good foundation of food and nutrition knowledge on which to base their decisions. Adults can suggest, advise, and even serve nutritious foods to children, but children have the last word about foods they put into their mouths. There are several good tools to help consumers select good nutritious foods, and children can start learning to use these tools at an early age.

NUTRITION LABELING

FOOD LABELS provide us with information concerning product names, manufacturer's names, net contents and a list of the ingredients (listed in order of descending prominence by weight). **NUTRITION LABELS** provide even more information, such as serving size, number of servings per container, amount of calories, protein, carbohydrate and fat per serving and protein, vitamins and minerals per serving as a percentage of the U.S. RDA*. Many food containers have nutrition labels, however they are required only processed food products that make a nutritional claim; for example, 'enriched bread' must carry a nutrition label.

Nutrition labeling is a tool to use in selecting food products. It provides a means to compare the nutritional quality of products. For example, the nutrition labels from different types of ready-to-eat cereals can be compared: one cereal which is "fortified with eight essential vitamins and iron" can be compared with a "100% natural" cereal, which has no vitamins or minerals added.

Another use is the identification of special properties of a food such as the amount of calories or the presence of specific vitamins or minerals. For example, the nutrition label on a gelatin dessert product labeled "low calorie" can be compared to a gelatin dessert not labeled as such, to see the calorie difference. The vitamin C content of grape juice that is labeled "enriched with vitamin C" can be compared to grape juice which is not enriched by reading the nutrition labels. Nutrition labels provide information concerning the presence or absence of certain nutrients like salt or cholesterol in foods. For example, the sodium content of 'dietetic' labeled green beans can be compared to 'regular' green beans by reading the nutrition labels.

**The RDAs (Recommended Dietary Allowances) are the levels of intake of essential nutrients considered to be adequate to meet the known nutritional needs of practically all healthy persons in the U.S. The U.S. RDAs are derived from the RDAs and in most instances contain the highest RDA suggested for any age-sex group for each nutrient.*

Math 2-6

ACTIVITY 4.1: COMPARING LABELS

Objective

The students will learn to read food labels to determine the amounts of nutrients and % U.S. RDAs present in foods.

Materials

Clean, empty food containers children can bring from home.

In the Classroom

Students will compare labels to determine the food with the highest amount of vitamin C, vitamin A, iron and calories per serving. They will then read the column of % U.S. RDA for those nutrients and determine which food supplies the highest % U.S. RDA of each nutrient.

UNIT PRICING

UNIT PRICING is another tool for the consumer to use when selecting food products. It provides the consumer with a means to determine the relative cost of food sold in units of varying weights or in different sizes. Unit price tags or lists are usually found on the edge of the shelf under the product. They contain the prices of the items and costs per pound, quart or other common unit. Unit pricing allows consumers to compare costs without having to calculate them.

Math 4-6

ACTIVITY 4.2: USING UNIT PRICING

Objective

Students will learn how to use unit pricing to determine the most economical purchase to make.

Materials

Food containers with labels and price tags.

In the Classroom

Students will determine the cost per serving for each food, (by dividing the cost by the number of servings per container). The students will then calculate the cost per ounce of the foods (by dividing the cost by the total number of ounces in the container). If similar foods are used the students can determine which is the least expensive brand to buy.

CENTS OFF COUPONS

Using **CENTS-OFF-COUPONS** is another tool for the consumer to use to select food items. Many people save many dollars on their grocery bill by clipping coupons from local newspapers, magazines and grocery store flyers. Being a smart consumer often takes some work. Watching for store specials can also save the consumer money at the check-out counter.

ACTIVITY 4.3: COUPON SAVINGS

Objectives

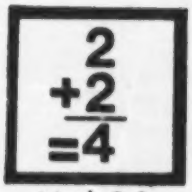
Students will become familiar with using cents-off coupons and they will realize savings available by using this tool.

Materials

Cents-off coupons and the empty food containers, paper, pencil

In the Classroom

The students will determine the cost of the food item after the discount. Students should record all the savings made and how much was saved for the whole bag of groceries. (For older students: What % was saved?)



Math ? 6

OTHER FACTORS INFLUENCING DECISIONS

As consumers we have many tools to help make decisions about food choices but there are other factors which influence the types of foods and the brands of food we buy. Very young children are often influenced in their food choices by the already established preferences of their parents, peers, and relatives. As children become older they are exposed to the influence of advertising.

ADVERTISEMENTS often use subtle methods of selling products. They appeal to consumers' emotions, such as referring to sentimental stories of childhood memories. Special music, scenery or images are also used to persuade consumers. Television ads, radio spots, billboards and food containers all use special techniques to sell their products.

ACTIVITY 4.4: "BUY MY PRODUCT"

Objectives

Students will learn what's involved in developing an advertisement.

Materials

Assorted art supplies

In the Classroom

Divide students into teams of 3-4 people. The teacher will give each team a name of a fresh vegetable. Using materials in the classroom, the teams will design an advertisement to sell their product to the class. After each advertisement has been shown, a tally will be taken to see how many students would buy that product. Research could be done on the food product, familiar jingles or phrases can be used. Advertisements must follow rules of Fair Trade Commission (FTC): Information used in the advertisement must be true.

Communication Skills
4-6

Supermarkets have developed **FLOOR PLAN STRATEGIES** for influencing consumers in their choices of food. For example, more expensive items are displayed at eye level; "sale" or "bargain" items are arranged at the end of an aisle; candy bars are often at the cash register for quick pick up while standing in line. Consumers should be made aware of such tactics.

As children enter school and become interested in others their own age, they increasingly influence and are influenced by peers. This influence extends to food choices. Often it can be observed that best friends are eating the same foods or that over a period of time they are likely to make very similar food choices.

Magazines and newspapers can influence food choices of older students and adults with popular food information. Some of this information is valuable and based on sound scientific evidence. Other information may be misleading. Consumers need to be aware of the reliability of the source of any food and nutrition information.

YOUNG CONSUMERS

Children, who are just beginning to exercise their consumer power, need to recognize the complex network of factors which influence their food preferences. They should begin learning to use some helpful tools to make intelligent decisions about what they eat. Being a smart consumer takes skill and practice.

5

PREVENTIVE NUTRITION

We have an abundance of high quality food available to us in the United States. However, the existence of a plentiful and varied food supply does not insure nutritional well-being. There are major health problems in the U.S. which are nutrition related; some are of special concern for children; i.e., obesity, dental disease, and iron deficiency anemia. Preventive measures which encourage favorable lifelong attitudes and practices in nutrition need to begin in infancy and must be continually reinforced. The development of children who will experience their fullest potential is the desired goal of preventive health care, of which nutrition is a major part.

OBESITY

OBESITY, or being too fat, is a significant health problem; it is the most widespread form of malnutrition in the U.S. today.* People who are obese have a greater incidence of health problems (diabetes, hypertension, respiratory insufficiency) and die at an earlier age. In addition to health problems there is a stigma attached to being obese. It can be a source of social embarrassment and discrimination which could have a significant impact on the self-image and emotional and psychological well-being of a child.

Children become obese for the same reasons that adults do: 1) excessive food intake, 2) too little physical activity, or 3) a combination of overeating and inactivity.

A calorie is the measurement used to keep count of the energy in our food. A person needs a certain amount of calories each day to maintain body functions and physical activity, but if he/she eats more food than is used, the extra calories will be stored in the body in fat cells. Fat cells increase in size as more and more energy is stored. The only effective way to "burn up" or use up extra calories is to decrease the amount of food eaten and/or increase physical activity.

There is a strong association between obesity in childhood and obesity in adulthood. Since many food preferences and attitudes about foods are developed early in life, it is important to identify food choices and lifestyles (sedentary vs. physically active) in children which may lead to problems of weight gain and obesity.

There are a few important things children can do for themselves to guard against becoming obese. Children can be made aware of the fact that everyone requires different amounts of foods and uses them at different rates. Children, while learning to be proud of their abilities to eat everything on their plates, can also be proud of their abilities to choose the appropriate foods for their individual energy needs. Eating several small meals during the day discourages the trend toward obesity.

Physical activity is just as important to a healthy body as eating the right kinds and amounts of foods. An enthusiasm for regular physical activity is important for all children.

*Obesity is generally defined as being at least 20% in excess of your ideal weight. Perhaps the best method of determining whether or not you are too fat is simply by looking in the mirror. If you look too fat, you probably are.

ACTIVITY 5.1: COUNTING CALORIES

Objective

The children will understand the concept of the calorie by comparing the amount of calories selected foods provide to the amount of calories selected activities consume.

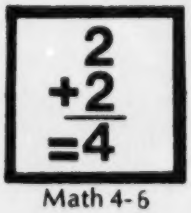
Materials

paper, pencil

In the Classroom

1) List ten physical activities in which students may participate (chart below). Have students arrange the activities according to what they think is the most energy consuming activity down to the least energy consuming activity. The teacher will fill in the kcal/hr. for a child of 60 lb. and the children will compare activities.

2) Teacher will list 12 foods (chart below) which the students are likely to eat. Students will arrange the foods according to those they think provide the most heat energy (kcal) to those which provide the least heat energy. The teacher will fill in the correct values for calories/serving. Again the children will compare foods.



Math 4-6

ACTIVITY 5.1 (cont'd)

Activity chart	Kcal/60 lb./hr.(approx.)	Food Chart	Kcal.
Vital body processes	700/day	1 egg (fried)	100
Bicycling (mod. speed)	67		
Dishwashing	27	1 glass milk 8 oz	160
Eating	11	1 hot dog (no bread)	170
Running	189	1 ground beef patty 3 oz. cooked (no bread)	186
Sitting	11	1 slice cheese, 1 oz.	113
Standing	14	1 tomato (medium)	26
Swimming (2 mph)	213	1 apple (large)	70
Walking (3 mph)	54	Ice cream 1 c. (vanilla)	255
Writing	11	1 cookie (choc. chip)	50
		1 c. spaghetti & meatballs	330
		1 slice of bread	65

Definition of calorie or kilocalorie—the amount of heat necessary to raise the temperature of a liter of water 1°C. Calorie is the term used as a measure of the energy in food which is used in our bodies to maintain vital body functions such as respiration, digestion, glandular activity, nerve function, heartbeat, etc. and for voluntary physical activities. Approximately 700 kcal/day are needed for a 60 pound child just for maintenance of vital body processes.

Children may best understand the concept of calories by explaining that the term 'calorie' is a measure of energy in food just as 'inch' and 'pound' are measure of length and weight. Our bodies get fuel from the calories in food just as automobiles use fuel from gasoline to function.

DENTAL DISEASE

DENTAL DISEASE is widespread and considered to be the most prevalent disease for all ages after infancy. The Ten State Nutrition Survey (1972) reported that 5 and 6 year old children averaged 4-5 dental caries while 80% of the 10 year old children had dental caries in their permanent teeth.

The development of dental caries requires the presence of a susceptible tooth, an oral environment conducive to the growth of harmful microorganisms (bacteria) and a diet providing an adequate substance on which the bacteria grows. Various carbohydrates serve as food for the bacteria in the mouth; however, the primary ones used are sugars, with sucrose being the most cariogenic. Cariogenic foods are those foods which most promote dental caries. (Starches are less cariogenic because they are metabolized more slowly by the bacteria.) Sugars are metabolized by the bacteria quickly and form a sticky plaque which adheres to the teeth and gums. Acids produced by the bacteria demineralizes the tooth enamel resulting in tooth decay. Dental disease is considered to be a nutritional disorder.

The total quantity, form and frequency of consumption of carbohydrate are important in the formation of dental caries. Consuming large amounts of sticky sweets like caramels is especially conducive to caries' development. Frequency of eating sticky, sugary foods is also related to increased chances for caries development. The more often sugary foods adhere to tooth surfaces the more time bacteria have to react with the sugar and produce acid. Forbidding children to eat between meals is probably unrealistic and actually may not be a successful solution. A better approach may be to suggest foods to be avoided between meals as well as a list of those permitted. Sugar, honey, candies, jellies, jams, cookies, cakes, sweetened beverages are some of the foods which should be avoided when eating is not followed by teeth brushing, while fresh fruits, vegetables, breads, crackers, cheeses, lean meats and milk should be encouraged.

Fluoride in the correct amount has been shown to effectively decrease the incidence and severity of dental caries. The fluoride combines with other bone and tooth forming minerals, i.e. calcium and phosphorus, to stabilize the teeth and bones against destruction by resorption and decay.

Prevention of dental disese is a lifelong process. The practice of sound nutritional habits and oral hygiene can effectively decrease the incidence of this disorder in children and adults.

ACTIVITY 5.2: TOOTH DECAY

Objectives

The student will observe that some beverages are more likely to promote tooth decay than others.

Materials

Three or more teeth. (These may be obtained from a local dentist.) One glass of milk and one glass of soft drink, and one glass of water.

In the Classroom

Put at least one tooth in each glass. Explain that the students can check from day to day to see what changes have occurred in the teeth. In 2-3 weeks the tooth in the soft drink will show obvious signs of decay.

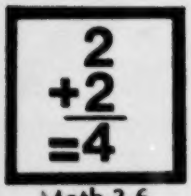
Science K-6

IRON-DEFICIENCY ANEMIA

IRON DEFICIENCY ANEMIA is another of the most common nutritional problems in the U.S. If iron stores are low, the body cannot make enough hemoglobin to fill its new red blood cells. Without enough hemoglobin the cells will be small and unable to carry enough oxygen from the lungs to the tissues. Energy release from the tissues will be slowed, resulting in fatigue and weakness.

Babies are born with enough iron to last a few months. Thereafter, children need to eat iron rich foods. A mixed diet which includes meats, eggs, legumes, dark green leafy vegetables and enriched or whole grain bread and cereal products will provide some good sources of iron. But careful food selection is necessary.

Meats are especially rich in iron although individual meats do vary in iron content. Liver is a very good source but many foods can be chosen to supply iron in the diet. See chart at end of this unit.



Math 3-6

ACTIVITY 5.3: FOODS WITH IRON

Objectives

The student will learn which foods supply them with an adequate amount of iron daily.

Materials

A list of 20-30 foods and their iron content. A chart may be drawn on the blackboard. Paper, pencils.

In the Classroom

The children will select foods that will supply 18 mg. of iron/-day. The RDA for children and young adults is 18 mg./day. Foods chosen should fit well into child's meals.

SOURCES OF IRON IN THE DIET

	Serving Size	Milligrams (mg) Iron
liver, beef	2 oz.	5.0
beans, dry	¼ cup	3.5
beef, lean, chuck	3 oz.	3.1
beef, hamburger	3 oz.	3.6
pork chop	1 chop	2.7
spinach	½ cup	2.2
peas, green	½ cup	1.5
tuna fish, canned	½ cup	1.5
rice, enriched, cooked	¾ cup	1.4
chicken, fried	½ breast	1.3
haddock, fried	4 oz.	1.3
raisins	¼ cup	1.3
sweet potato	1 medium	1.1
tomato juice, canned	½ cup	1.1
egg	1 medium	1.0
macaroni, enriched, cooked	¾ cup	1.0
sausage, bologna	2 oz.	1.0
frankfurter	1 medium	0.9
oatmeal, cooked	⅓ cup	0.9
banana, raw	1 medium	0.8
bread, whole wheat	1 slice	0.8
bun or roll, enriched	1 bun	0.8
strawberries, raw	½ cup	0.8
bread, white enriched	1 slice	0.7
potato, white	1 medium	0.7
broccoli	½ cup	0.6
peanut butter	2 Tablespoons	0.6
corn, canned	½ cup	0.6
cornflakes, fortified	1 cup	0.6

Americans spend billions of dollars on health care. Most health care treats the disease after its occurrence. Nutrition related diseases most common to children are obesity, dental disease and iron deficiency anemia. Prevention of such diseases is a less costly and more effective approach to health care.

RESOURCES

Professional Organizations

1. American Dental Association, 211 East Chicago Avenue, Chicago, IL 60611.
2. American Dietetic Association, 430 North Michigan Avenue, Chicago, IL 60611.
3. American Heart Association, 44 East 23rd Street, New York, NY 10010.
4. The National Foundation, March of Dimes, P.O. Box 2000, White Plains, NY 10602.
5. Society for Nutrition Education, 2140 Shattuck Avenue, Suite 1110, Berkeley, CA 94704.

Agencies

1. Cooperative Extension Service
   listed under your county in telephone directory.
   —Ask for Home Economist, Agricultural Agent, or 4-H Agent

2. Intermediate School District
   listed under your county in telephone directory
   —Regional Educational Media Center (REMC)
   Audio-visual materials available to teachers.
   —Nutrition Education Training (NET) food service and nutrition education specialists available to teachers.

3. National Dairy Council (NDC), 6300 N. River Rd., Rosemont, IL 60018.
   Ask for local office.
   —NDC has preschool-12 classroom nutrition education materials.

4. Consumer Education Department of major food companies.
   —for list of pamphlets and audiovisual materials appropriate for classroom use.
   —field trip to local company

Publications

1. *Consumer Education Bibliography*. No cost. Prepared by the Office of Consumer Affairs, and The New York Public Library, Superintendent of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402.
2. *Food*. U.S. Department of Agriculture, Home and Garden Bulletin No. 228, U.S. Govt. Printing Office, Washington, D.C. 20402. Attractive booklet on food groups and creative recipes. Cost $1.00.
3. *Nutrition and Your Health*. U.S. Department of Agriculture and the U.S. Department of Health, Education, and Welfare, U.S. Govt. Printing Office, Washington, D.C. 20402. Free. Suggested dietary guidelines for Americans.

4. *Bogert's Nutrition and Physical Fitness*. G.M. Briggs, D.H. Calloway, W.B. Saunders, 1979. General nutrition text.
5. *Nutrition and Food Choices*. K.W. McNutt, D.R. McNutt, Science Research Associates, Inc., 1978. General nutrition text.
6. *Nutrition in Action*. E.A. Martin, A.A. Coolidge, Holt, Rinehart, and Winston, 1978. General nutrition text.
7. *Understanding Nutrition*. E. Whitney, M. Hamilton, West Publishing Co., 1977. General nutrition text.
8. *What's To Eat*, 1979 Yearbook of Agriculture, price $4.50, Government Printing Office Bookstore, 477 Michigan Avenue, Room 160, Detroit, MI 48226. Resource book for children (K-8). Offers activities, and information in a creative form.
9. U.S. Department of Agriculture, Consumer Informaton and Publications, Pueblo, CO 81009. Offers many free pamphlets on nutrition issues. Ask for list of publications.

Activity Resources in the Community

1. Food and Nutrition professors, local colleges and universities
   - — for inservice programs or workshops
   - — for verification of nutrition information
   - — for classroom nutrition education ideas, resources

2. Food-related Professionals
   baker, butcher, restaurant manager, school food service staff, grocery store produce manager, farmer, food inspector, food processing plant manager, grain mill manager.
   - — for field trips to retail or wholesale business
   - — as speaker for class
   - — career opportunities

3. Health professionals
   local physician, dentist, dental hygienist, public health nutritionist, dietitian, school nurse
   - — for field trips to place of business
   - — as speaker for class, resource people

4. School Food Service Director
   - — career opportunities
   - — school meal planning and preparation
   - — field trip to main kitchen in school district